

REMARKS

This Amendment and Response is provided in response to the Office action mailed December 23, 2003. An in-person interview was conducted with the Examiner on April 30, 2004, to discuss the Office action and the cited prior art. The Applicants and the Applicants' representative thanks the Examiner for the courtesy extended in conducting the interview.

At the conclusion of the interview with the Examiner, the Examiner completed the Interview Summary form and identified the claims, prior art, and discussions that were the substance of the Interview. As discussed with the Examiner, Applicants' representative agrees that the discussion included in the Summary accurately identifies the substance of the Interview.

The amendments to the claims contained herein contain no new matter. In view of these amendments and the following arguments, Applicants respectfully submit that the application is now in condition for allowance.

Claim Rejections - 35 U.S.C. § 102

The Examiner rejected claims 75, 76, 77, and 78 under 35 U.S.C. § 102 as being anticipated by Alft U.S. Pat. No. 6,308,787. Claim 75 has been canceled. Claims 76 has been amended to further define Applicants' invention. Claim 77 has been amended to correct a scrivener's error. Applicant respectfully requests reconsideration of the § 102 rejection of claims 76-78.

Independent claim 76, as amended, is directed to a method for using a horizontal drilling machine having a plurality of automated functions and comprising a drill string to which an underground tool is attached. The method comprises axially advancing the drill string so as to move the underground tool along at least a portion of the selected path until a change of direction is required, while automatically operating at least one of the plurality of automated functions.

Alft discloses use of a horizontal drilling system having a drilling machine, a drill string, a drive system, a plurality of sensors, and a central processor. Alft indicates that the drive

system may include a rotation motor and a thrust pump for advancing the drill string. Alft also suggests that the amount of fluid dispensed to the downhole tool may be modified depending on the amount of fluid and material that is expected to be removed from the borehole. Nowhere, however, does Alft describe or suggest axially advancing the drill string so as to move the underground tool along at least a portion of the selected path until a change of direction is required, while automatically operating at least one of the plurality of automated functions, as claimed in Applicants' claim 76. Instead, Alft only generally suggests that the machine controller controls boring tool direction. Alft suggests a procedure in which the boring tool position may be obtained but then only generally suggests that a course correction may be necessary. Alft does not adequately describe or suggest axially advancing the drill string so as to move the underground tool along at least a portion of the selected path until a change of direction is required, as Applicants have done in describing the present invention. Consequently, claim 76, as amended, is not anticipated by Alft, and the § 102(b) rejection of this claim must be withdrawn.

Claims 77 and 78 are dependent claims, depending directly from independent claim 76, and contain all of the limitations thereof. As claims 77 and 78 depend from claim 76, these claims are also allowable over Alft and the § 102 rejection should be withdrawn.

Claim Rejections 35 U.S.C. § 103

The Examiner rejected claims 25 and 57-71 as unpatentable under 35 U.S.C. § 103(a) over Alft. Claim 25 has been amended to more particularly define the invention. Certain of dependent claims 57-70 have been amended to correct scrivener's errors. Claim 71 has been canceled. Applicant respectfully requests reconsideration of the § 103 rejection.

Independent claim 25, as amended, is directed to a horizontal drilling system comprising a horizontal drilling machine having a plurality of automated functions and a machine control system. The machine control system comprises a plurality of sensors and a main control circuit. At least one of the plurality of automated functions is selected from the

group comprising a pipe handling function, a guidance control function, and a tracking function. Further, claim 25, as amended, specifically identifies sensors included in the plurality of sensors, when the automated function selected comprises the guidance control function or the tracking function.

As discussed with the Examiner, Alft discloses a horizontal drilling system having a drilling machine, drill string, a drive system, a plurality of sensors, and a central processor. Alft indicates that the processor may operate parts of the drilling system. Alft does not, however, adequately describe or suggest the particular sensors that are required to automatically operate the drilling machine, or describe or suggest the operation of the processor, when a guidance control or tracking function is operated, as is claimed in Applicants' claim 25.

Alft does not disclose, for example, that when the tracking function of the machine is automatically operated, the main control circuit is adapted to calculate a position of the downhole tool in response to the roll position signal, the pitch signal, the orientation signal, *and* the temperature signal, as claimed in Applicants' claim 25. Instead, Alft merely suggests that other data concerning the operation of the machine may be obtained. Alft does not adequately describe which or how any information would be used in a tracking function, as Applicants have done in describing the present invention.

Alft also does not disclose that when the guidance control function of the machine is automatically operated, the main control circuit is adapted to operate the drive system in response to the thrust output signal, the rotation output signal, and the carriage position signal until a change of direction is required for the downhole tool, as claimed in Applicants' claim 25. Instead, Alft only generally suggests that the machine controller controls boring tool direction. Alft further suggests that the boring tool position may be obtained and then only generally suggests that a course correction may be necessary or that operations may need to be terminated in response to an unspecified anomaly. Alft does not adequately describe or suggest how the thrust output, the rotation output, and the carriage position are used to operate the drive system

until a desired change point is reached, as Applicants have done in describing the present invention.

Furthermore, Alft does not adequately describe the machine controller when the pipe handling function of the machine is automatically operated. Alft merely suggests that the controller could be used to add a length of pipe onto a drill string with an automatic rod loader of the type described in a commonly assigned patent. However, the loaders suggested for use with the Alft invention are mechanical devices with no automatic control described, and the Alft disclosure does not describe or suggest how the operations of a loader may be controlled by the machine controller. Applicants' invention and description, on the other hand, incorporates by reference a copending and commonly assigned patent application that describes the sensors and inputs required and functionality of the main control circuit to automatically operate the pipe handling assembly. Alft does not adequately describe or suggest how the machine controller would automatically control the pipe handling function.

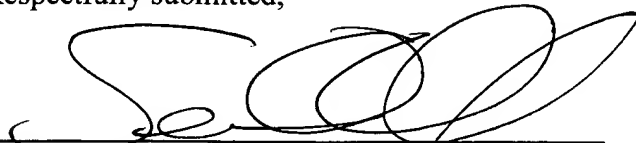
Applicants' submit, therefore, that claim 25 is allowable over Alft and the § 103 rejection must be withdrawn.

Claims 57-70 are dependent claims, depending directly or indirectly from independent claim 25, and contain all of the limitations thereof and further define Applicants' invention. As claims 57-71 depend from claim 25 and include further limitations with respect to Applicants' invention, these claims are also allowable over Alft and the § 103 rejection should be withdrawn.

Applicants submit that the application, as amended herein, now is in condition for allowance. A Notice of Allowance courteously is solicited. In the event that there are any questions or comments concerning this amendment or the application, the Examiner is invited to contact the undersigned.

This is intended to be a complete response to the Office Action mailed
December 23, 2003.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Sean V. O'Connell', is written over a horizontal line.

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